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(71) Applicant
Thorn EMI Domestic Appliances Limited (United Kingdom),
Thorn EMI House, Upper Saint Martin's Lane, London WC2H 9ED

(72) Inventor
David Wellcome

(74) Agent and/or Address for Service
R G Marsh,
Thorn EMI Patents Limited, The Quadrangle, Westmount Centre, Uxbridge Road, Hayes, Middlesex UB4 0HB

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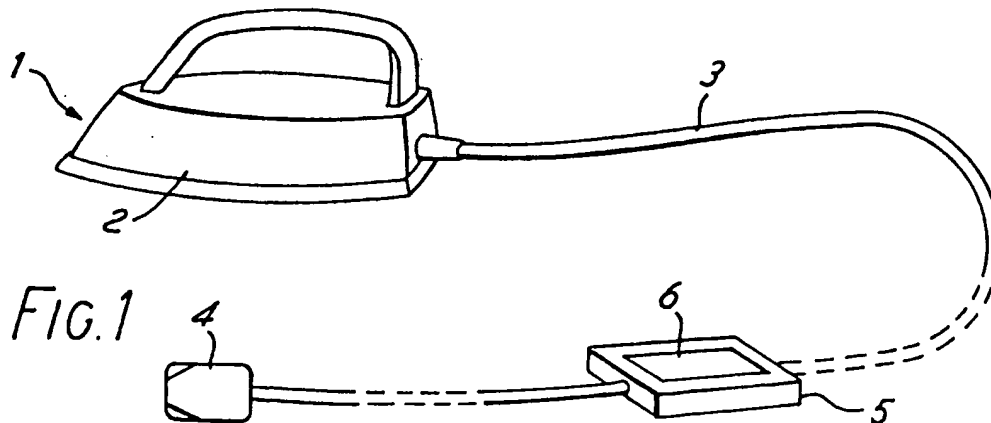
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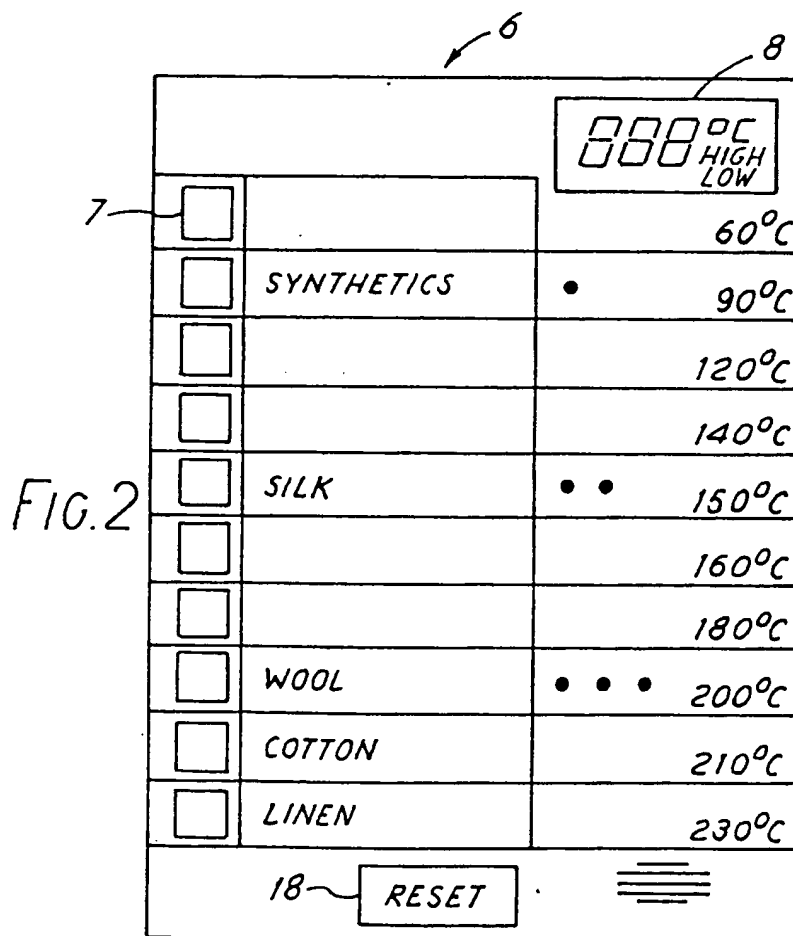
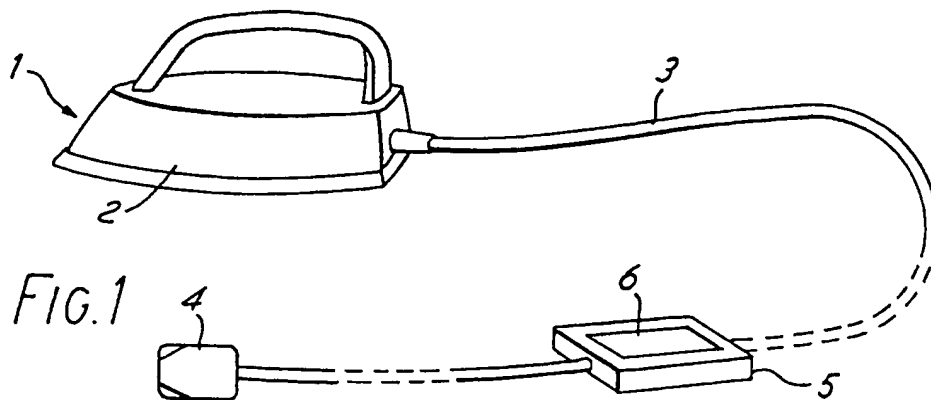
(54) Domestic electrical appliances

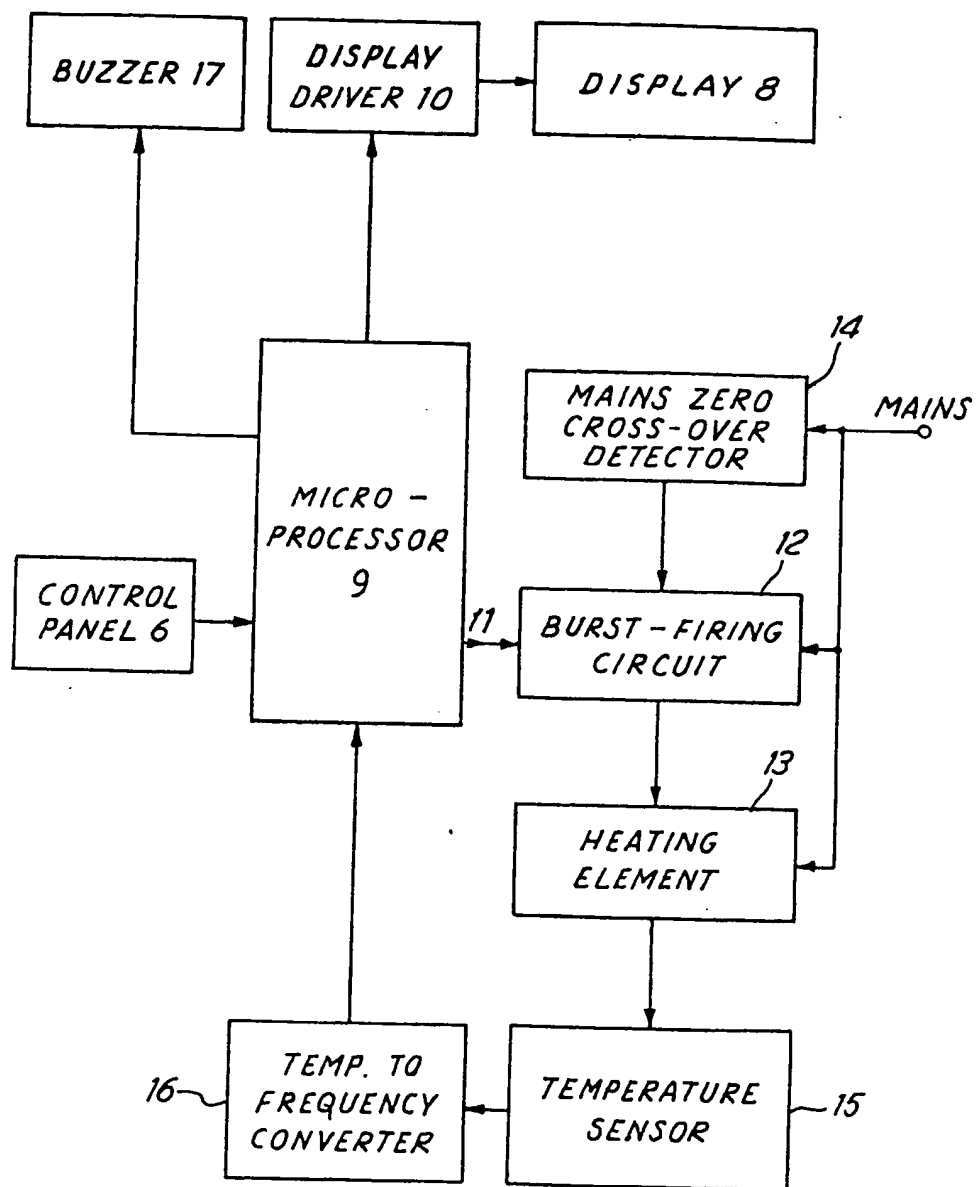
(57) A domestic iron (1) is connected by an electrical lead (3) to a conventional electrical plug (4). A control box (5), accommodating electronic components for controlling working components in the iron body (2), is interposed at any suitable location along the lead (3). The electronic components are electrically connected to the working components through the lead (3), and the box (5) is provided with a user-operable control for controlling operation of the iron (1) and a display panel (6) for displaying temperature, etc., of the iron (1).

The control box (5) may be arranged to stand on, or clip onto, an ironing board, and the box may also be of suitable dimensions so that the iron (1) can be rested thereon.

The control box may be used for other substantially portable domestic electrical appliances, such as hair-dryers, hand-held food mixers, toasters, etc.







SPECIFICATION

Domestic electrical appliances

5 This invention relates to domestic electrical appliances and in particular, though not exclusively, to appliances which are generally regarded as portable, such as irons, hair dryers, hand-held food mixers, toasters, etc.

10 It is generally desirable for portable domestic appliances, such as irons, hair dryers, etc., to be relatively compact and light-weight, which may cause problems when a considerable number of working and electronic components for controlling certain operational parameters, such as temperature, speed, etc., of the appliance are required to be housed within the appliance body.

Further problems may also arise in certain 20 appliances which are used for heating or drying purposes, such as irons, hair dryers, toasters, etc., in that, whilst satisfying the requirement of compactness, the appliance heating element may have to be located too close to the temperature control to allow an electronic, rather than a mechanical, temperature control to be employed, because the electronic control may be susceptible to malfunction under high temperature conditions.

30 It is an object of the present invention to alleviate the above-mentioned problems.

According to the present invention there is provided a domestic electrical appliance comprising a substantially portable main body portion accommodating working components of said appliance, and a housing, remote from said body portion, accommodating electronic components for controlling said working components, said electronic components being 40 electrically connected to said working components through an interconnecting lead between said housing and said body portion.

Preferably, the housing is provided with a user-operable control panel for controlling the appliance and a suitable display for displaying certain operational parameters of the appliance.

In a preferred embodiment, the appliance is an iron and the control panel, which preferably includes a number of press-buttons, is used to select the required iron temperature, which is displayed on the display.

The invention will now be further described by way of example only with reference to the accompanying drawings, wherein:-

Figure 1 shows schematically a preferred embodiment of the invention,

Figure 2 shows a suitable control and display panel for the embodiment, and

60 *Figure 3* shows a flow chart of the operation of the embodiment shown.

Referring to Fig. 1, an iron 1 has a body portion 2 accommodating working components, such as a heating element, of the iron.

65 The iron 1 is connected by an electrical lead 3

to a conventional electrical plug 4 for connection to the main power supply.

70 Interposed at any suitable location along the lead 3 is a control box 5 which accommodates electronic components for controlling the working components of the iron 1. The electronic components are electrically connected to the working components through the lead 3 and the box is also provided with a user-operable control and display panel 6 for controlling the operation of the iron 1.

75 *Figure 2* shows a suitable control and display panel 6 for the iron 1. The panel 6 includes a row of press-buttons 7, each button corresponding to a particular temperature of the iron 1, which is heated by the heating element within the body portion 2. Also indicated on the panel 6 are the fabric types suitable for each temperature and conventional dot markings used on conventional iron temperature controls.

80 A digital display 8 indicates the temperature which is selected by a user by pressing one of the buttons 7, and the digital display 8 also indicates whether the actual temperature of the iron is higher or lower than the selected temperature on the display 8.

85 *Figure 3* shows a flow chart of the operation of the electronic and working components of the iron. Input from a user of the iron, through press-buttons 7 on the control panel 6, to select the iron temperature required, is passed to a microprocessor 9 in the control box 5. The selected temperature is passed from the microprocessor 9 to the digital display 8, via a display driver 10. A control signal 11 is also passed from the microprocessor 9 to a burst-firing circuit 12, which controls actuation of a triac for energising heating element 13 within the iron body portion 2. The burst-firing circuit 12 also has an input from the mains power supply and from a mains zero cross-over detector 14. The control signal 11 from the micro-processor 9 controls the firing period of the triac during a set timer period of, for example, 3 seconds, during which time the triac cannot be re-activated. Activation of the triac thus determines the proportion of each set time period that the heating element 13 is connected to the mains power supply and therefore energised, which thus controls the temperature of the heating element.

95 A temperature sensor 15, preferably in the form of a thermistor, is located within the iron body portion 2 to monitor the actual iron temperature and is connected, via a temperature-to-frequency convertor 16, to the microprocessor 9 in the control box 5 through the lead 120 3.

125 The microprocessor 9 can then compare the actual temperature of the iron, as monitored by the temperature sensor 15, with the user-selected temperature on the display 8 and adjust operation of the burst-firing circuit 12 ac- 130

cordingly, until the iron 1 attains the selected temperature. When the selected temperature has been attained, the microprocessor 9 energises a buzzer 17 to indicate to the user that the iron 1 is at the selected temperature, and the high or low indication on the digital display 8 is de-energised.

An additional feature of the iron may provide de-energisation of the heating element 13 when it appears that the iron has not been used for a predetermined time period of, for example, 10 minutes. This may be implemented by monitoring the temperature of the iron, via temperature sensor 15, and using the principle that if the temperature remains unchanged for the predetermined time period then the iron has not, in fact, been used during that time. In these circumstances, the microprocessor 9 is arranged to de-energise the heating element 13. The control panel 6 may be provided with re-set button 18, which may be pressed to re-energise the heating element 13 after de-energisation due to detected non-use of the iron.

As an alternative or additional feature to the buzzer 17 for indicating to the user that the iron has attained the selected temperature, energisation of an LED (not shown) provided on the control panel 6 may be used to indicate the same.

The control box 5 may be arranged to stand on, or clip onto, an ironing board, and the box 5 may also be of suitable dimensions to enable the iron 1 to be rested thereon.

Although the present invention has been described in relation to an iron, it may of course be used for many other substantially portable domestic electrical appliances, such as hair-dryers, hand-held food mixers, toasters, etc., which are also required to be relatively lightweight and compact. In these alternative applications, the control box 5 may be arranged to stand, for example, on a table-top or on the floor, and the control and display panel 6 may be designed accordingly for the requirements of each application.

The present invention is thus advantageous over conventional, substantially portable domestic electrical appliances in that the electronic components of the appliance for controlling the working components of the appliance, such as heating elements, etc., are located remote from the appliance body, thereby enabling the body to be more compact and light-weight than conventional arrangements of such appliances, as well as alleviating problems associated with over-heating of electronic components.

60 CLAIMS

1. A domestic electrical appliance comprising a substantially portable main body portion accommodating working components of said appliance, and a housing, remote from said body portion, accommodating electronic com-

ponents for controlling said working components, said electronic components being electrically connected to said working components through an interconnecting lead between said housing and said body portion.

2. An appliance as claimed in Claim 1 wherein said housing is provided with a user-operable control panel for controlling operation of said working components.

3. An appliance as claimed in Claim 1 or Claim 2 wherein said housing is provided with display means for displaying operational parameters of said appliance.

4. An appliance as claimed in Claim 2 wherein said appliance is an iron and said control panel includes means for selecting a required temperature of said iron, the actual temperature of said iron being monitored by a temperature sensor in said iron body portion.

5. An appliance as claimed in Claim 4 wherein said housing includes means for indicating to a user of the iron that said iron has attained said required temperature.

6. An appliance as claimed in any preceding claim wherein said appliance is an iron and said housing includes means for de-energising said iron, if apparent non-use of said iron is sensed for a predetermined time period after energisation of said iron.

7. A domestic electrical appliance substantially as herein described with reference to the accompanying drawings.

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